

Application No. 10/076,976

REMARKS

Claims 18-30 are pending. By this Amendment, claim 18 is amended for clarity. Specifically, a phrase was moved within the claim for clarity. Applicants do not intend to narrow the claim by this amendment. Also, Applicants have amended the specification to update a reference to a copending application that has subsequently issued. No new matter is introduced by the amendments.

All of the pending claims stand rejected. Applicants respectfully request reconsideration of the rejections based on the following comments.

Rejection Under the Enablement Requirement

The Examiner rejected claims 18-30 under 35 U.S.C. §112, first paragraph for lack of enablement. The Examiner has explained clearly the basis for the rejection, but with all due respect, the rejection is not well founded. The Examiner has not established prima facie lack of enablement. Applicants respectfully request reconsideration of the rejection based on the following analysis.

The Examiner indicated that "the claim should include the forces, namely Van der Waals and [other] electromagnetic [forces] that are disclosed in the instant specification, that cause the particles to become 'loosely agglomerated' besides these forces that are other forces not named in the instant specification that could cause particles to 'weakly' agglomerate. In other words, the claims are broader than the enabling scope of the specification." With all due respect, there are many things wrong with this assertion.

First, there are no other forces. The undersigned has a Ph.D. in physical chemistry and can speak as an expert in this area. There are no other forces. Any other forces would be a type of electromagnetic force. Thus, "other electromagnetic forces" includes ALL other forces. Perhaps, the Examiner is referring to electrostatic forces, as referred to in the

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materials attached by the Examiner. But electrostatic forces are a type of electromagnetic force. There simply are no other forces, and the Examiner has not asserted any.

Second, the enablement requirement simply only requires the enablement of the claimed invention. The Examiner does not argue that Applicants' have not enabled the formation of "weak agglomerates." The Examiner seems to be asserting someone has control over the forces that nature uses to agglomerate particles. While the words of the Office Action are clear and make sense, the concepts are not clear. No one can control the types of forces particles exert on each other. The forces of nature are the forces of nature. If Applicants have taught how to form weakly agglomerated particles that is all that is logically required. There simply do not exist different types of weak agglomerates based on the forces that they exert to hold the agglomerates together. With all due respect, this does not make sense. The degree of agglomeration is a meaningful concept, but this is distinct from the types of forces exhibited in nature.

Since Applicants have fully enabled the claimed invention, the Examiner has not asserted a prima facie case for lack of enablement. Applicants respectfully request withdrawal of the rejection of claims 18-30 under 35 U.S.C. §112, first paragraph for lack of enablement.

Rejections Under 35 U.S.C. § 102

The Examiner rejected claims 22 and 29 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 5,840,111 to Wiederhöft et al. (the Wiederhöft patent). With all due respect, Applicants request clarification of the status of claim 18 under the Wiederhöft patent. Since claims 22 and 29 depend from claim 18, it seems that the rejection generally would also be directed to claim 18. With respect to the details of the rejection, the issues are discussed in detail in the following analysis. Applicants maintain that the Examiner has not raised a prima facie

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case of anticipation. Applicants respectfully request reconsideration of the rejection based on the following comments.

Applicants would like to take the advice of the Examiner on page 4 of the Office Action and "carefully re-read the Wiederhöft reference" while leading the Examiner through the reference in this response. In columns 1 and 2 of the Wiederhöft patent, there are at least two earlier approaches for the formation of titanium dioxide, a sol-gel approach (column 1, lines 47-55) and a sulphate process (column 2, lines 26-34). The Wiederhöft patent criticizes the product of the sulphate process that "none yields a product comparable in terms of fineness and transparency with sol/gel materials." The Wiederhöft patent proceeds to describe a variation on the sulphate process at column 4. Specifically, the process is based on titanyl sulphate, see column 3, lines 6-10. The Wiederhöft patent does not describe a sol-gel process, which is based on titanium alkoxides, see column 1, lines 47-67. However, the product of the process in the Wiederhöft patent is a "sol" (column 2, lines 43-46) but this is not a sol-gel process.

An initial question is what if the composition of a titania sol. This can be clearly answered based on the evidence in front of us. Referring to the four sulphate process references cited in the Wiederhöft patent, these provide clear evidence. First, U.S. 2,448,683 refers to "anhydrous TiO_2 " (column 1, lines 6-14). An anhydrous TiO_2 can be formed from a colloidal TiO_2 dispersion by drying or dehydration generally at calcination temperatures of 850 to 950°C (column 1, lines 15-22). The process in the '683 patent differs from the prior approaches in that the colloidal solution is treated with a alkaline neutralizing agent prior to calcining the colloid to for the anhydrous material (column 1, lines 33-37). With respect to the EP 0 261 560 A application, this application only discusses a hydrated titania sol and does not discuss an anhydrous titania sol.

The EP 0 444 798 A application describes a particular variation on the sulphate process. In particular, the hydrated TiO_2 , i.e., "titanium dioxide hydrate," is subjected to a base,

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then HCl, and finally neutralized. See, for example, page 3, lines 41-58. The resulting materials are eventually dehydrated in a calcining step followed by grinding. See, for example, page 4, lines 12-28. The '798 application accurately describes the materials as microcrystalline to reflect the hard agglomeration of the particles, in which the crystallite size is the size of the grains within the fused structures. Fused structures can be seen throughout Fig. 1 in the application.

EP 0 499 863 A is in German, but U.S. 5,215,580 seems to be a corresponding U.S. case. The particles formed in the process of the '580 patent are similar subjected to a heat-treatment, as in the '798 application and the '683 patent. For example, see the abstract. The process in this patent involves the processing of a "titanium hydroxide suspension." See, for example, column 3, lines 7-18. The heat treatment is again described at column 4, lines 40-53. Milling is described, for example, at column 4, line 67 to column 5, line 2.

The process used in the Wiederhöft patent is a variation on the processes described above in the four references. It is unambiguous that prior to the heat treatment, a hydrated titanium dioxide material is formed. The hydrated metal oxides are well known to be hydroxides. Specifically, for titanium dioxide, the hydrated material would be $\text{Ti}(\text{OH})_4$ or $\text{TiO}_2 \cdot 2\text{H}_2\text{O}$, which is also known as titanic hydroxide. The heat treatment removes the water of hydration, but this is a chemical reaction that alters the particle properties, including fusing of the particles.

As described in the Wiederhöft patent at column 7, lines 5-8, the composition comprises 59.8 weight percent TiO_2 . It further comprises 9.8 percent HCl impurity and 1.23 % sulphate impurity. If the remaining weight of the product (29.2%) is water, this almost exactly corresponds with $\text{TiO}_2 \cdot 2\text{H}_2\text{O}$. Thus, the Wiederhöft patent is clearly teaching that they are producing titanic hydroxide and not titanium dioxide. To form the non-hydrated material would require calcining to drive the water hydrodation from the material. This calcining process to

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remove the water of hydration is described in the '683 patent, the EP '798 application and the '580 patent. This heating/calcining process results in strong agglomeration.

This evidence is all internally consistent and leads clearly to the conclusion that the process described in the Wiederhöft patent simply does not lead to the formation of Applicants' disclosed and claimed materials. The Examiner's assertions that Applicant's statements are "not true" simply are inconsistent with the teachings in the art. The Examiner has not presented a case for prima facie anticipation. Applicants respectfully request withdrawal of the rejection of claims claims 22 and 29 under 35 U.S.C. § 102(b) as being anticipated by the Wiederhöft patent.

CONCLUSIONS

In view of the foregoing, it is submitted that this application is in condition for allowance. Favorable consideration and prompt allowance of the application are respectfully requested.

The Examiner is invited to telephone the undersigned if the Examiner believes it would be useful to advance prosecution.

Respectfully submitted,



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